



Politecnico di Torino

Porto Institutional Repository

[Article] Breathomics can discriminate between anti IgE-treated and non-treated severe asthma adults

Original Citation:

Santini, Giuseppe; Di Carlo, Stefano; Benso, Alfredo; Mores, Nadia; Brinkmann, Paul; Valente, Salvatore; Montuschi, Paolo; Macagno, Francesco; Politano, Gianfranco Michele Maria; Wagener, Ariane H.; Bansal, Aruna T.; Knobel, Hugo H.; Vink, Anton J.; Rattray, Nicholas; Santonico, Marco; Pennazza, Giorgio; Wang, Yuanyue; Horvath, Ildiko; Djukanovic, Ratko; Polosa, Riccardo; Fowler, Stephen J.; Chanez, Pascal; Chung, Kian F.; Sterk, Peter J.; Montuschi, Paolo (2015). *Breathomics can discriminate between anti IgE-treated and non-treated severe asthma adults*. In: [EUROPEAN RESPIRATORY JOURNAL](#), vol. 46 n. Suppl., p. 1. - ISSN 1399-3003

Availability:

This version is available at : <http://porto.polito.it/2622355/> since: November 2015

Publisher:

European Respiratory Society

Terms of use:

This article is made available under terms and conditions applicable to Open Access Policy Article ("Public - All rights reserved") , as described at http://porto.polito.it/terms_and_conditions.html

Porto, the institutional repository of the Politecnico di Torino, is provided by the University Library and the IT-Services. The aim is to enable open access to all the world. Please [share with us](#) how this access benefits you. Your story matters.

(Article begins on next page)

VOLUME 46 / SUPPLEMENT 59 / SEPTEMBER 2015

EUROPEAN RESPIRATORY *journal*

OFFICIAL SCIENTIFIC JOURNAL OF THE ERS

Abstracts / *25th International Congress*
Amsterdam, Netherlands 26 –30 September 2015

Online ISSN: 1399-3003



ERS EUROPEAN
RESPIRATORY
SOCIETY
every breath counts

Copyright for individual abstracts remains with the authors.

This abstract supplement has been produced electronically by the European Respiratory Society. The European Respiratory Society is not responsible for errors or omissions in content. The ideas and opinions expressed in this publication do not necessarily reflect those of Coe-Truman and the European Respiratory Society. Products mentioned in this publication should not be construed as an endorsement of the product or the manufacturer's claims. Readers are encouraged to contact the manufacturer with any questions about the features or limitations of the products mentioned. The European Respiratory Society assumes no responsibility for any injury and/or damage to persons or property arising out of or related to any use of the material contained in these abstracts. The reader is advised to check the appropriate medical literature and the product information currently provided by the manufacturer of each drug to be administered to verify the dosage, the method and duration of administration, or contraindications. It is the responsibility of the treating physician or other health care professional, relying on independent experience and knowledge of the patient, to determine drug dosages and the best treatment for the patient. An effort has been made to check generic and trade names, and to verify drug doses. The ultimate responsibility, however, lies with the prescribing physician. Please convey any errors to scientific@ersnet.org.

Citations should be made in the following way: **Authors. Title. Eur Respir J 20015; 46: Suppl. 59, abstract number.**



Table Of Content

| | |
|--|----------|
| 160. Phenotyping asthma with biomarkers | 2 |
| OA1463: Breathomics can discriminate between anti IgE-treated and non-treated severe asthma adults | 2 |



160. Phenotyping asthma with biomarkers

OA1463

Breathomics can discriminate between anti IgE-treated and non-treated severe asthma adults

Giuseppe Santini¹, Stefano Di Carlo², Alfredo Benso², Nadia Mores¹, Paul Brinkman³, Salvatore Valente⁴, Paolo Montuschi², Francesco Macagno⁴, Gianfranco Politano², Ariane H. Wagener³, Aruna T. Bansal⁵, Hugo H. Knobel⁶, Anton J. Vink⁶, Nicholas Rattray⁷, Marco Santonico⁸, Giorgio Pennazza⁸, Yuanyue Wang⁶, Ildiko Horvath⁹, Ratko Djukanovic¹⁰, Riccardo Polosa¹¹, Stephen J. Fowler⁷, Pascal Chanez¹², Kian F. Chung¹³, Peter J. Sterk³, Paolo Montuschi¹, U-BIOPRED Study Group

¹Pharmacology, Catholic University of the Sacred Heart, Rome, Italy; ²Computer Engineering, Polytechnic of Turin, Turin, Italy; ³Respiratory Medicine, Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands; ⁴Internal Medicine and Geriatrics, Catholic University of the Sacred Heart, Rome, Italy; ⁵Biostatistics, Acclarogen Ltd., Cambridge, United Kingdom; ⁶Physical Chemistry, Philips Research Laboratories, Eindhoven, Netherlands; ⁷Respiratory Medicine, University of Manchester, Manchester, United Kingdom; ⁸Electronic Engineering, Università Campus Bio-Medico, Rome, Italy; ⁹Respiratory Medicine, Semmelweis University, Budapest, Hungary; ¹⁰Respiratory Medicine, University of Southampton, Southampton, United Kingdom; ¹¹Internal Medicine, University of Catania, Catania, Italy; ¹²Respiratory Medicine, University of Marseille, Marseille, France; ¹³Respiratory Medicine, Imperial College, London, United Kingdom

Rationale: Omalizumab, an anti-IgE monoclonal antibody, is indicated in adults with severe persistent allergic asthma. Exhaled molecular markers can provide phenotypic information in asthma. **Objectives:** Determine whether adults with severe asthma on omalizumab (anti-IgE⁺) have a different breathprint compared with those who were not on anti-IgE therapy (anti-IgE⁻) as assessed by eNoses and gas chromatography/mass spectrometry (GC/MS) (breathomics). **Methods:** This was a cross-sectional analysis of the U-BIOPRED adult cohort. Severe asthma was defined by IMI-criteria [Bel, Thorax 2011]. Anti-IgE⁺ patients were on a regular treatment with s.c. omalizumab (150-375 mg) every 2-4 weeks. Exhaled volatile compounds trapped on adsorption tubes were analysed by a centralized eNose platform (Owlstone Lonestar, two Cyranose 320, Comon Invent, Tor Vergata TEN), including a total of 190 sensors, and GC/MS. Recursive feature elimination (<http://topepo.github.io/caret/rfe.html>) was used for feature selection and random forests, more robust to overfitting, for classification. **Results:** 9 anti-IgE⁺ (females/males 2/7, age 52.6±16.3 years, mean±SD, 1/2/6 current/ex/nonsmokers, pre-bronchodilator FEV₁ 70.6±21.1% predicted value) and 30 anti-IgE⁻ patients (18/12 females/males, age 53.2±14.2 years, 0/16/14 current/ex/nonsmokers, pre-bronchodilator FEV₁ 59.6±30.7% predicted value) were studied. Accuracy of classification is shown in Table 1.

Table 1

| eNose/Technique | Variables | Accuracy |
|-----------------|-----------|----------|
| TOR | 4 | 0.87 |
| LONE | 71 | 0.83 |
| CYRA2 | 12 | 0.82 |
| CI | 2 | 0.87 |
| CYRA1 | 14 | 0.75 |
| All eNoses | 110 | 0.85 |
| GC/MS | 96 | 0.83 |
| eNoses+GC/MS | 16 | 0.83 |

Conclusions: Preliminary results suggest that breathomics can distinguish between anti-IgE⁺ and anti-IgE⁻ severe asthma patients.